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Final

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Theophil Markus LUTZ and Christian CHEVRET
Serial No.	:	10/552,222
For	:	PRODUCT FOR TREATING REINFORCED CONCRETE CONSTRUCTIONS
Filed	:	September 25, 2006
Examiner	:	Green, Anthony J.
Art Unit	:	1973
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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. §1.132

We, Theophil Markus LUTZ and Christian CHEVRET, hereby declare that:

1. We are the named inventors in the above-captioned application and that we have read and are familiar with the application.

2. In view of our education, training and experience, we consider ourselves qualified to express the statements and opinions herein. The experiment of which the results are presented herein, were performed under our direction, supervision or control.

3. We have read and are familiar with the Final Office Action issued on December 19, 2008 (hereinafter merely "the Final Action") and with the Advisory Action issued on March 26, 2009 (herein merely "the Advisory Action").

4. We have already made a first Declaration, which was filed on March 18, 2009, in response to the comment raised in the Final Action, especially as it relates to the rejection of claims 14-16 and 18-27 under 35 U.S.C. § 103 (a) as allegedly being unpatentable over U.S. Patent Publication No. 2005/0258401 to Lane et al. (hereinafter merely "Lane"), and as allegedly being unpatentable over Lane in view of U.S. Patent No. 4,098,614 to Ray (herein after merely "Ray").

5. We are making this second Declaration in response to the comment raised in the Advisory Action requesting "to provide more convincing evidence that shows the unexpected results achieved".

6. We believe that the claimed invention is unobvious and patentable over Lane and Ray, considered either alone or in combination for the reasons explained herein.

7. The present patent application states at page 3, lines 20-21 that Lithium glycerophosphate (LiGP) has much greater penetrability into concrete that Sodium glycerophosphate (NaGP).

8. We presented in our first Declaration experimental results showing, upon using 0.1 molar solutions, that NaGP penetrated to a depth of about 40 mm into concrete samples, whereas LiGP penetrated to a depth of about 60mm, that is to say about 50% deeper.

9. The following experimental results show that this unexpected result is not achieved solely by using 0.1 molar solutions. Penetration depth of LiGP and NaGP were compared at 3 different working solution concentrations, namely 1 M, 0.5 M and 0.25 M. The concrete samples and essay methods are the same as in the first Declaration, except that concentration values are measured after 48H instead of 24 H. The table hereinafter shows the Glycerophosphate ("GP") concentrations expressed in % concrete at several depths from the surface level.

Data from different working solution concentrations:

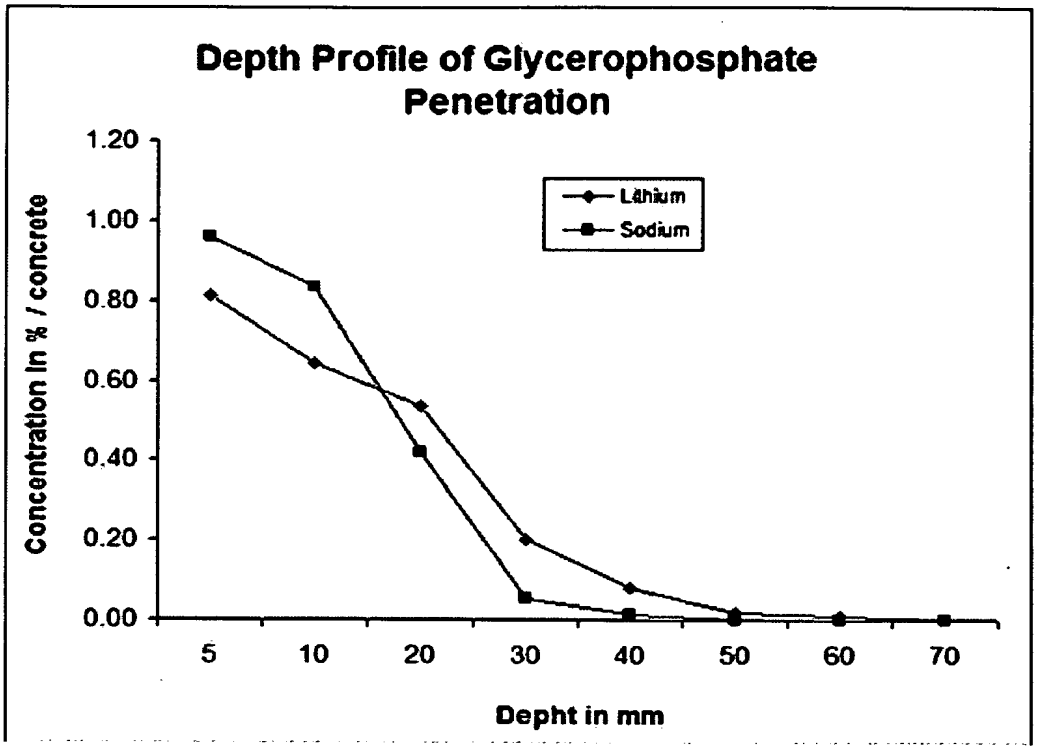
Concentration in mol / L	**Lithium 1**	**Sodium 1**	**Lithium 0.5**	**Sodium 0.5**	**Lithium 0.25**	**Sodium 0.25**
Depth in mm						
5	0.811	0.958	0.466	0.306	0.124	0.266
10	0.643	0.834	0.182	0.588	0.159	0.303
20	0.533	0.417	0.160	0.302	0.153	0.133
30	0.201	0.055	0.061	0.016	0.042	0.016
40	0.080	**0.013**	0.038	**0.003**	0.027	**0.004**
50	0.019	0.001	0.009	0.001	0.007	0.000
60	**0.009**	0.000	**0.005**	0.000	**0.002**	0.000
70	0.001	0.000	0.000	0.000	0.000	0.000

Bold: Penetration limit after 48 h

The Lithium salt penetration is significantly deeper than the sodium salt:
A significant salt concentration for LiGP is found at 60 mm, and for NaGP at 40 mm only.

The graph hereunder shows the depth profile of Glycerophosphate penetration for the 1.0 molar Li and Na working solutions.

It is worthwhile to note that the usual position of rebars in concrete is between 20 and 40 mm from the surface of concrete. The concentration values and the profile show that LiGP covers much more this range than NaGP. The diffusion is much better for the Lithium than for Sodium salt.



10. This shows that the Li compound is much more appropriate for penetrating a concrete structure and reaching embedded steel rebars than the Na compound. This result was fully unexpected before the present invention was made, and this is neither disclosed in Lane, nor in Ray.

11. Moreover, the experimental results concerning penetrability show that the Li salt and the Na salt are not equivalent. Neither Lane nor Ray, alone or in combination, suggests in anyway the superior penetration ability of the Lithium glycerophosphate.

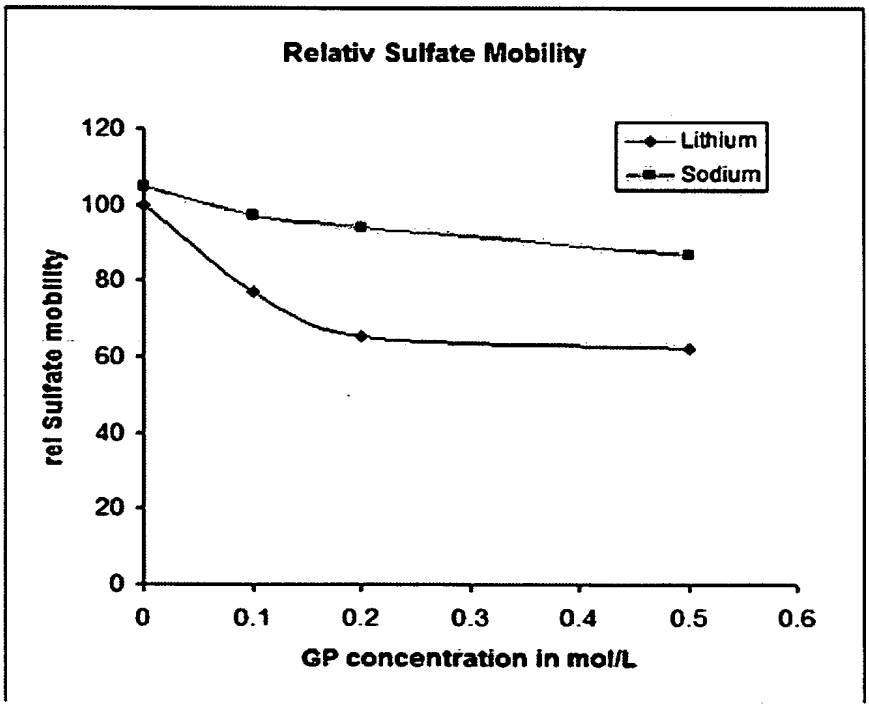
12. The experimental results hereinafter show an unexpected effect of LiGP on Sulfate mobility.

Concrete surface samples treated with working solutions of LiGP and NaGP resp. at different concentrations, are thereafter extracted with water. Sulfates diffuse into water, where the concentration is measured.

The table hereinafter shows the concentrations of sulphate, in relative units, in the water extract.

Conc. (mol/L)	LiGP	NaGP
0.0	100	105
0.1	77	97
0.2	66	94
0.5	62	87

The above data are plotted in the graph below:



Remark: The differences between the points 100 and 105 lie within experimental error limits.

Lithium-Glycerophosphate lowers significantly, between 20 and 40% the sulphate mobility, where as the sodium salt has only a very little effect. We believe that the Lithium salt is more efficient because this species is much more hydrated than the sodium salt.

To our knowledge, there is no commercial product on the market that reduces the mobility of the sulphates of concrete.

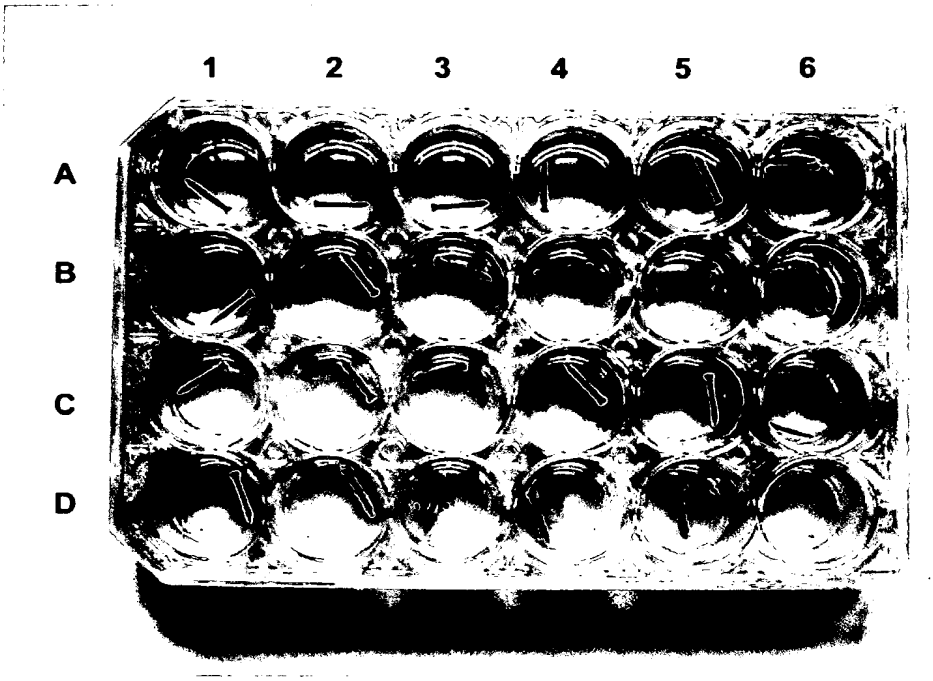
13. The following color picture shows a corrosion test comparing Lithium Glycerophosphate and Sodium Glycerophosphate.

Iron nails were dropped in a set of cells containing various LiGP and NaGP solutions in distilled water. In each row, the concentration is divided by 2 from one cell to the next cell at the right.

Legend :

	LiGP solutions		NaGP soluions
Position	mol / L	Position	mol / L
A1	0.1	C1	0.1
A2	0.05	C2	0.05
A3	0.025	C3	**0.025**
A4	**0.0125**	C4	0.0125
A5	0.00625	C5	0.00625
A6	0.003125	C6	0.003125
B1	0.0015625	D1	0.0015625
B2	0.00078125	D2	0.00078125
B3	0.00039063	D3	0.00039063
B4	0.00019531	D4	0.00019531
B5	9.7656E-05	D5	9.7656E-05
B6	0	D6	0

Results after 48h are shown in the photograph below.



Corrosion starts appearing in cells A5 and C4 respectively:

i.e. The corrosion inhibition efficiency limit is double with the Lithium salt compared to the Sodium salt.

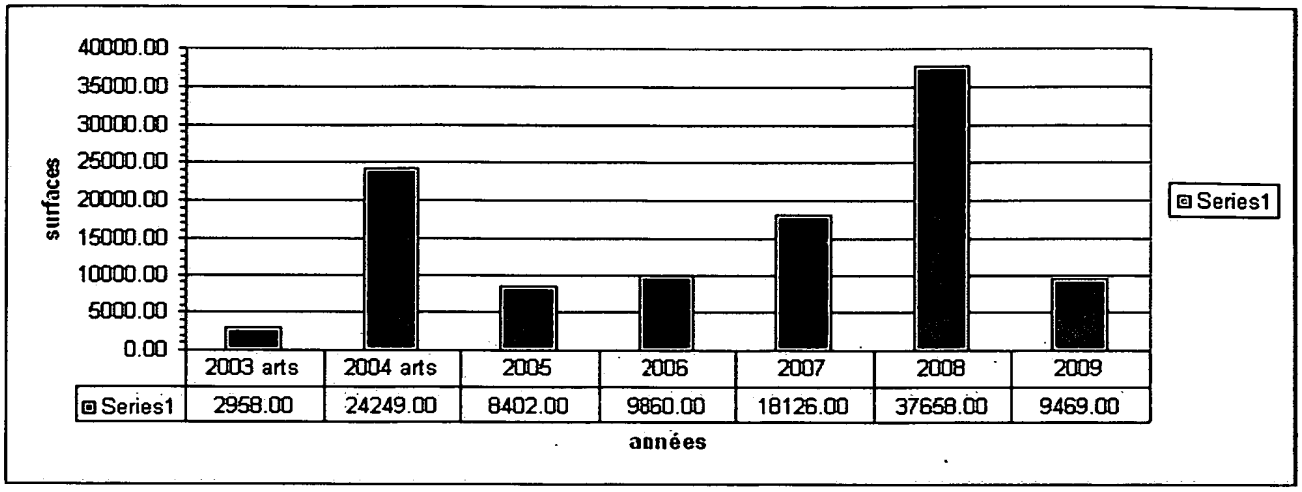
14. The following tables present commercial results.

The assignee of the patent application offers concrete treatment services in Switzerland.

The figures below (in Swiss Francs) show an increasing success of the LiGP based commercial product.

Year of Work	Surface Treated M2
2003	2958.00
2004	24249.00
2005	8402.00
2006	9860.00
2007	18126.00
2008	37658.00
2009	9469.00

Total	110722.00



15. Toxicity and environmental hazard

We present below data from official Swiss and German toxicity tables.

Product	CAS Number:	GK Swiss	WGK	Risk Statements
Na GP	55073-41-1	free	3	R22-36
Li GP	554-13-2	free	3	R22-36
Ferrogard	108-01-0	4	1	R10-20/21/22-34
MFP	10163-15-2	3	3	R22

Legend :

Ferrogard : Ferrogard is an Aminoalcool based product marketed by the Swiss Company Sika (Zurich).

MFP: Is a Sodium-mono-fluoro-phosphate based product marketed by the Swiss Company MFP (Geneva)

CAS Number: Chemical Abstracts Number (Molecule definition) GK Swiss: Swiss classification for toxicity of chemical compounds; 1 = very toxic; 5 = no toxic; free = public product. .
WGK: German Water Hazard; 3 = no problem; 1 = dangerous

Risk Statements:

Chemical data sheets available in many countries now contain codes for certain "risk phrases", shown as R23, R45 etc. These risk phrase codes have the following meanings:

- R10 Flammable.
- R11 Highly flammable.
- R12 Extremely flammable.
- R13 Extremely flammable liquefied gas o

R14 Reacts violently with water.

- R15 Contact with water liberates extremely flammable gases. o R16

Explosive when mixed with oxidizing substances.
o R17 Spontaneously flammable in air.
o R18 In use, may form inflammable/explosive vapour-air mixture. o R19
May form explosive peroxides.
o R20 Harmful by inhalation.
o R21 Harmful in contact with skin.
o R22 Harmful if swallowed.
o R23 Toxic by inhalation.
o R24 Toxic in contact with skin.
o R25 Toxic if swallowed.
o R26 Very toxic by inhalation.
o R27 Very toxic in contact with skin.
o R28 Very toxic if swallowed.
o R29 Contact with water liberates toxic gas.
o R30 Can become highly flammable in use.
o R31 Contact with acids liberates toxic gas.
o R32 Contact with acid liberates very toxic gas. o R33
Danger of cumulative effects.
o R34 Causes burns.
o R35 Causes severe burns.
o R36 Irritating to eyes.

The above figures show that LiGP presents advantageous toxicity and hazard properties as compared to commercial products Ferrogard and MFP.

16. In summary we respectfully submit that the claimed process is not the same as the process disclosed in the prior art references. The capability of the claimed composition is unexpectedly much superior to those of the prior art compositions.

17. We further declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true and further, that the statements made on information and belief are believed to be true and further, that the statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such wilful false statements may jeopardize the validity of the application or any patent issued thereon.

15.6.09
Date

Theophil Markus LUTZ

15.06.2009
Date

Christian CHEVRET